

# Perchlorate: Assessment of Proposed MCL

**Mic Stewart, Ph.D.**  
**Water Quality Section Manager**  
**Metropolitan Water District of Southern California**

**Southern California Association of  
Governments: Water Policy Task Force**  
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## Perchlorate Background

- **Used in solid rocket propellants, munitions, and fireworks**
- **In water**
  - Present as perchlorate anion ( $\text{ClO}_4^-$ )
  - Fully oxidized and very stable in water
  - Very soluble in water
  - Highly mobile and persistent in groundwater
- **Source of contamination**
  - Improper disposal of manufacturer wastes
  - Can also accumulate in lettuce and leafy vegetables irrigated with contaminated water

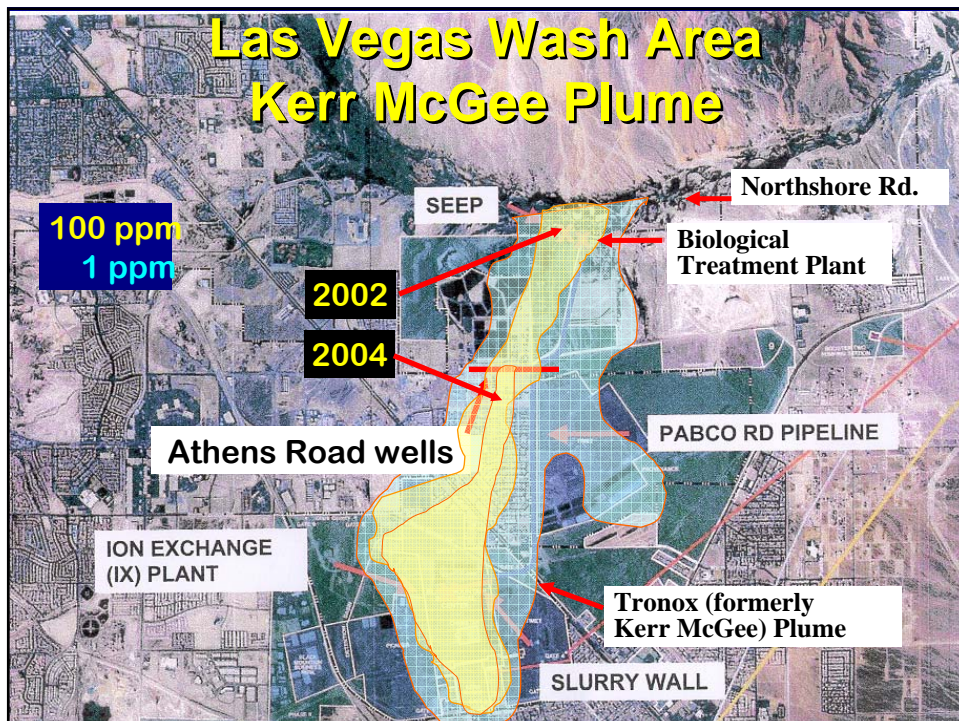
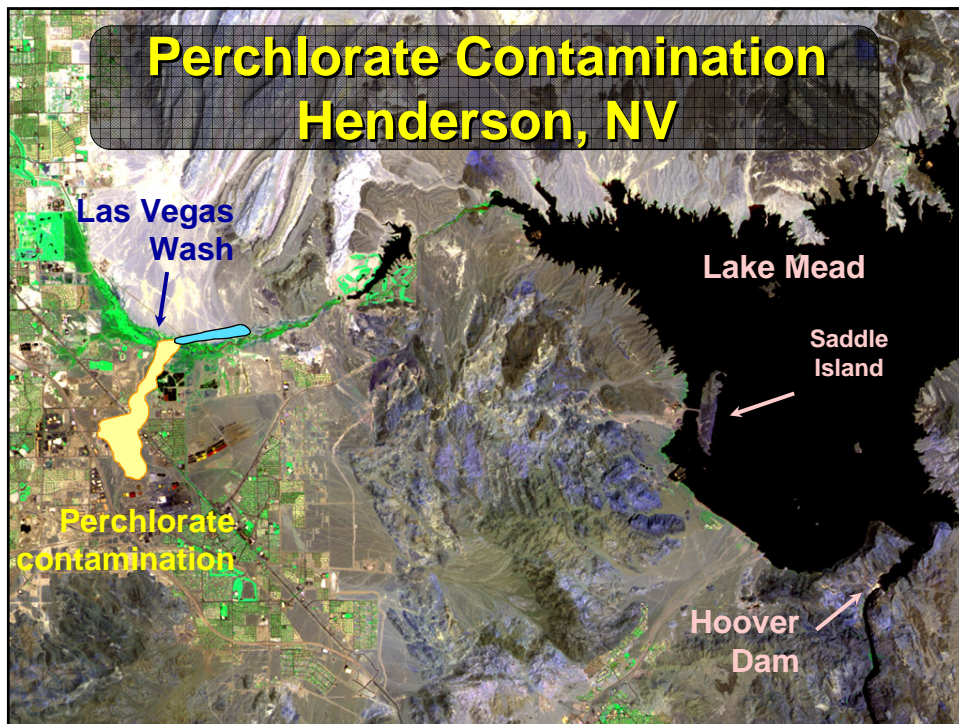


## **Perchlorate – Health Effects**

- **Interferes with thyroid gland's ability to uptake iodide**
  - Pregnant women, infants, and young children most susceptible
  - Affects normal metabolism, growth, and development

## **History of Contamination**

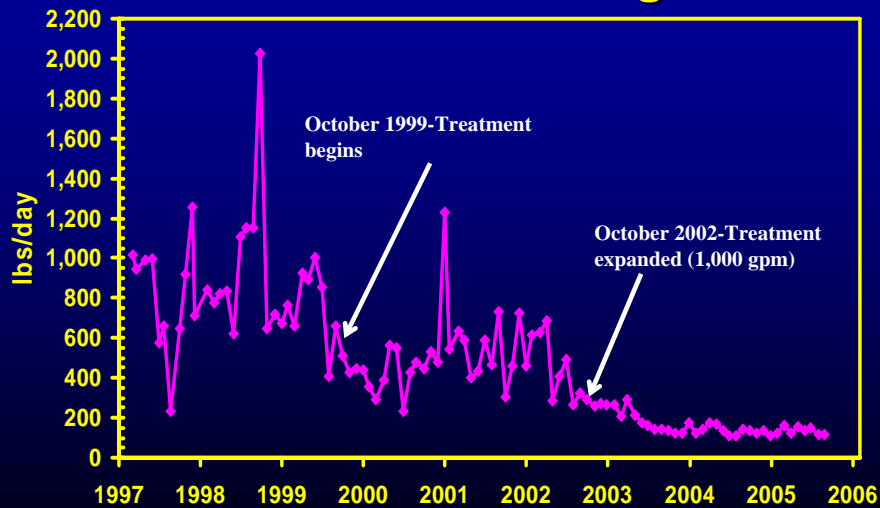
- **Kerr-McGee (currently Tronox)**
  - Kerr-McGee plume is most significant source entering Las Vegas Wash
  - Prior to remediation, plume released about 900 lbs/day; currently 110-150 lb/day
  - Remediation efforts began in 1999
- **PEPCON (currently American Pacific Corporation; AMPAC)**
  - Plume not currently impacting wash
- **Cleanup- under direction of the Nevada Division of Environmental Protection**



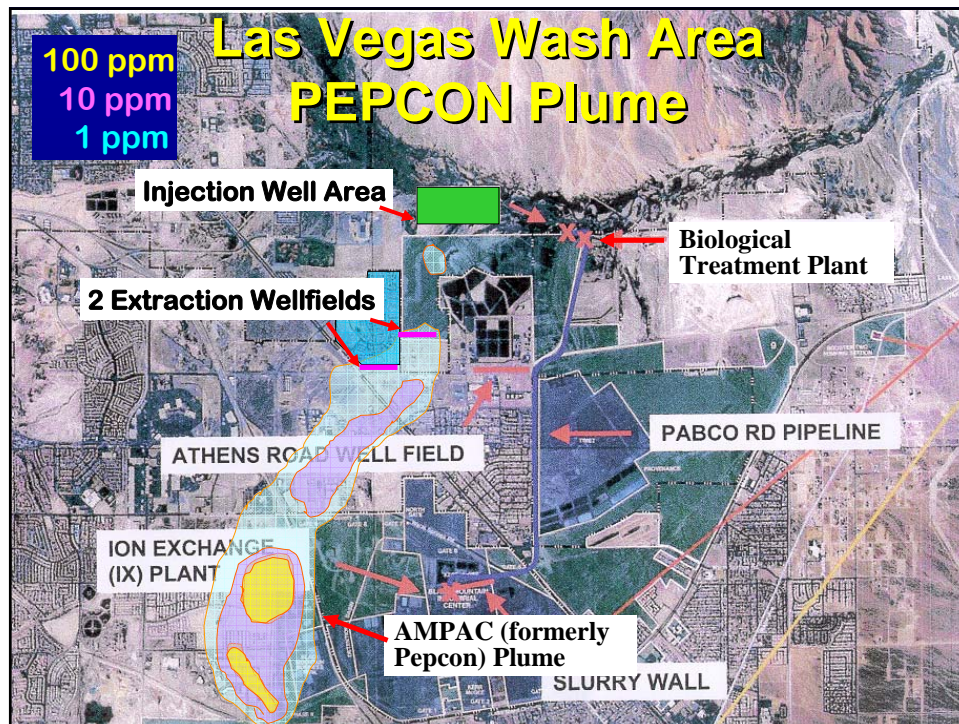
## Treatment of Plume

- Treatment began in 1999
- Expanded treatment to 1,000 gpm in 2002
- Installed biological treatment system in 2004
  - Less expensive than ion exchange
  - Currently treating >95% with biological
- Kerr-McGee estimates perchlorate capture at Athens Road is 97.5 %
  - Currently loading at Northshore Rd is 110-150 lbs/day
  - NDEP capture goal is >95%

## Perchlorate Loading At Northshore Rd. - Las Vegas Wash







## Perchlorate Removal Efficiencies and Costs by Various Treatment Technologies

Treatment Alternatives	Treatment Efficiency (%)	Treatment Cost (\$/AF)
Ion Exchange	> 95	195 - 450
Biological Reduction	> 95	> 150
Membranes	> 95	> 500
Electrodialysis	> 95	> 345
GAC/Polymer	40 - 45	> 500

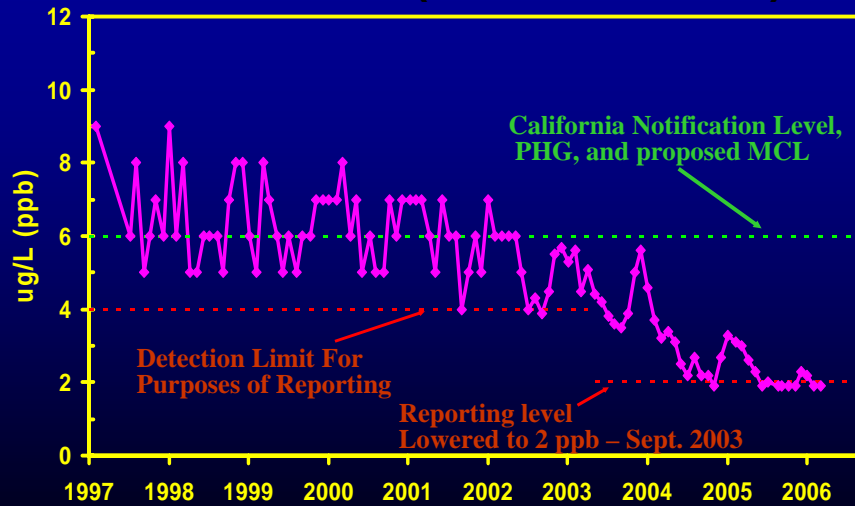
## Perchlorate Regulatory Timeline - California

- **1997**
  - Discovered in ground water in CA
  - CDHS establishes Notification Level of 18 ppb
    - Based on EPA reference dose (RfD) range of 4 – 18 ppb
- **1999**
  - CDHS requires quarterly monitoring for unregulated chemicals following EPA UCMR [completed Dec. 2003]
- **2002**
  - EPA revised RfD to 1 ppb
  - CDHS establishes DLR of 4 ppb
  - CDHS lowered Notification Level to 4 ppb
- **2004 (March)**
  - OEHHA established PHG of 6 ppb
  - CDHS adjusts Notification Level to 6 ppb
- **2006 (August)**
  - State MCL proposed at 6 ppb
    - Comments due November 3, 2006

## Perchlorate Regulatory Status – Other States

- **1 ppb**
    - Maryland
    - New Mexico – drinking water screening level
  - **2 ppb**
    - Massachusetts - Drinking water MCL and cleanup standard
  - **5 ppb**
    - New York – drinking water planning level
  - **14 ppb**
    - Arizona- guidance level
  - **17 ppb**
    - Texas – residential Protective Cleanup Level (PCL)
  - **18 ppb**
    - Nevada – Public Notice Standard
    - New York – Public Notification Level
  - **51 ppb**
    - Texas – industrial/commercial PCL
- 
- **Federal**
    - No federal MCL – EPA evaluating – Listed on CCL2

## Perchlorate Levels Lake Havasu (Whitsett Intake)



## Member Agencies Perchlorate Survey (2004)

- Number of Agencies with Detections
  - 16 Member Agencies; 33 Retail agencies
- Number of Wells
  - Total number wells - 700
  - Perchlorate detected -221
  - Closed – 43
  - Lost production – ~80,000 AF
- Levels detected – ND (<2) – 300 ppb
- Treatment/management options
  - Blending
  - Treatment- ion exchange or RO
  - New wells
- 2006 - Impact of proposed MCL of 6 ppb
  - Survey in progress

## Perchlorate - Summary

- **Colorado River system**
  - Industrial activities near Henderson, NV resulted in perchlorate contamination of lower Colorado River system
  - Cleanup efforts lowered levels entering Lake Mead
    - Dropped below 2 ppb at Metropolitan's Lake Havasu Intake
- **Metropolitan**
  - Levels in treatment plant effluents and distribution system are currently ND (< 2ppb)
    - All below proposed MCL of 6 ppb
  - No other sources of contamination identified in watersheds (CRW or SPW)
  - Metropolitan expected to meet MCL requirements
- **Member Agencies**
  - Groundwater
    - Well closure, blending, new wells or treatment implemented
  - Assessment of total lost production in progress